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Reptile Study



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MERIT BADGE SERIES
BOY SCOUTS of AMERICA
TWO PARK AVENUE
NEW YORK, N. Y.

REPTILE STUDY

REQUIREMENTS

To obtain a Merit Badge for Reptile Study, a Scout must:

1. Know what representative species of reptile (snakes, lizards, turtles, crocodiles) are found in his own state or locality. Be able to identify all these species.
2. Know distribution and typical life history of the crocodilians inhabiting the United States.
3. Be able to distinguish the poisonous reptiles of the United States.
 - (a) The one kind of poisonous lizard.
 - (b) Four kinds of poisonous snake, by shape, size, markings, heads, tails or by teeth (fangs).
 - (c) The location and operation of the fangs of the four kinds of snake.
 - (d) General distribution of the poisonous forms.
 - (e) Whether these poisonous snakes are aggressive or defensive, and how far they can strike.
4. Know eight harmless snakes, four of which feed on destructive rodents and know the food of each. Know how they capture and eat their food. Know something of the usefulness of the snake to man. Know how young snakes are produced—from eggs or living young; how and why a snake sheds its skin; why snakes are partly blind prior to shedding; the function of the snake tongue.
5. Know some of the important differences between the groups (snakes, lizards, turtles, crocodiles) as to (a) eyes, (b) ears, (c) teeth, (d) heart, (e) lungs, (f) limbs, (g) tails, (h) scales (shell).
6. (a) Know the typical life history of turtles, including where and when the eggs are laid, the number, color, shape and covering, and period of incubation. Recognize and describe five kinds of turtle, one of which shall be edible;

OR—

- (b) Know the typical life history of lizards; how young are produced—from eggs or living young. Recognize and describe five kinds, preferably common to his own region. Know the common food of lizard, and their usefulness to man in thus controlling pests. Know how and why a lizard will drop its tail and how it regrows.
7. Know the relative position of reptiles in the animal kingdom. Explain why, where and when reptiles hibernate, and the duration of the hibernation period.
8. Know what first aid treatment should be given in case of poison snake bite and the reasons for the same.

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2M—May, 1931

INTRODUCTION

THIS MATERIAL IS NO LONGER

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THIS is one of a series of pamphlets published by the Boy Scouts of America in connection with its Merit Badge scheme. This library on Scout activities and vocational guidance has been prepared by experts and is frequently revised and brought up to date.

We feel that the Merit Badge Series offers to boys a library that is unsurpassed in helpfulness, technical excellence, and wide range of interest. Much of the material that is here made available at a very moderate cost, it would be impossible to procure at any price elsewhere. Leading authorities have placed their time and knowledge at the disposal of the Boy Scouts as a contribution to the boyhood of America.

It would defeat the purpose of the Merit Badge plan if an attempt were made in the pamphlets to cover the requirements so completely as to make unnecessary the boy's using his own initiative and resourcefulness in seeking further information to enable him to meet the requirements successfully. The material in this pamphlet, however, provides a more comprehensive outline of the subject than would be practical in the Handbook for Boys. The pamphlets suggest the scope of the subjects, and serve as a guide. In each case the Scout should secure further book knowledge for himself and avail himself, on his own initiative, of such opportunities for further study as he can develop in his neighborhood or community, from men who are authorities on the subject and who often act as Merit Badge Counselors. Experience shows that men of this type are usually very glad to cooperate with boys who show an earnest interest in the subject.

Only the duly registered Scout may qualify for Merit

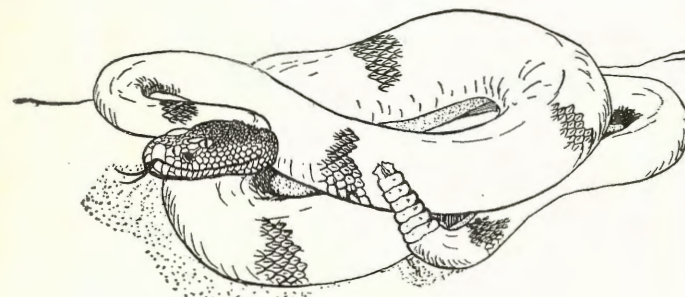
Badges. Second Class Scouts are eligible to take five of a selected list of forty subjects. First Class Scouts may qualify for the entire series.

The Merit Badge Counselor is appointed by the Committee on Scout Advancement. He is the man who helps the Scout prepare to meet the requirements and who conducts the examination under conditions as nearly as possible the same as those under which the Scout may be called upon to use the skills he has learned. A final check up on the boy's grasp of the subject is given by the Board of Review of the Local Council, and in larger communities by the District Board of Review, organized in order to reduce to a minimum the necessity of the boy traveling long distances. In communities where there is no Committee on Scout Advancement, an Examining Committee of at least three members supervises the Merit Badge tests.

In all examinations, it should be borne in mind that the purpose of the tests and examinations is not to secure a mere technical compliance with requirements, but rather to ascertain the Scout's general knowledge of subjects studied, and practical rather than book knowledge is desired. A Scout should be prepared at any examination for a review covering previous tests given him as well as to demonstrate that he is putting the Scout Oath and Law into daily practice.

With a view of increasing the value of these pamphlets to all boys, and particularly to Boy Scouts interested in securing Merit Badges, an attempt has been made in connection with each subject, to make available facts and information bearing on the vocational value of the subject. It is believed that this practical application in each case makes available a unique contribution to the literature for boys, and will be of great value to parents and teachers as well as boys throughout the whole country.

To further this object, those interested, and having suggestions to offer as to the vocational guidance treatment of any of the more than 100 subjects for which Merit Badge awards are provided are invited to correspond with E. S. Martin, National Director of Publications, The Boy Scouts of America, 2 Park Avenue, New York, N. Y.



Rattler in Position to Strike

REPTILE STUDY

WILLIAM G. HASSLER

How many people do you know who are afraid of snakes? Perhaps you are suspicious of them yourself. You have probably heard snakes and other reptiles spoken of with disgust and even awe, ever since you can remember. Yet for some reason you have become interested in them, else you would not now be reading this. Your reason may be no more than a desire to qualify for an additional Merit Badge, but even in this case, genuine interest is bound to develop long before you finish preparing for the examination. The Scout who holds a Merit Badge for Reptile Study should be of some assistance in answering questions about reptiles, especially local forms, in camp or under similar circumstances. It is his duty, just as doing a "good turn" is a duty, to pass on all the correct information possible to combat the general widespread ignorance and fear of reptiles. He should, with the aid of his knowledge, help to conserve one of the valuable, though little appreciated forms of aid which Nature supplies man in his fight against destructive rodents.

The following, then, is an explanation of the requirements for the Reptile Study Merit Badge with information, or the sources of such, that a Scout will need to pass these requirements. It is also an attempt to give a few of the many interesting observations on reptiles.

REPTILE STUDY

Requirement 1. Know what representative species of reptile (snakes, lizards, turtles, crocodiles) are found in his own state or locality. Be able to identify all these species.

In answering this question you should be able to name all those species that are found in your state, or if there are a number of similar species in a genus, to be able to tell approximately, at least, how many of these there are. Also you should be able to identify the more common species in your state and tell something about their habits, else this question is of no real practical value to you.

As nearly every state has some species of reptiles different from those of its neighbors it will be necessary for you to do some investigating of your own in order to determine the species found in your state. To attempt to give anything of the kind here would be out of the question as there are about four hundred species of reptiles in the United States with ranges that overlap in many cases, meaning constant repetition. Moreover, while some reptiles are rare in one locality they are common in another. It would likewise be difficult to give accurate information as to the common ones. However, there are several books that will help you with these problems. These will be discussed more fully later on.

To determine what species are found in your state it will probably be necessary to refer to either No. XI or No. XII in the Bibliography. The "Check List" is by far the easiest to use for this purpose but may be hard to obtain. Then there is "Pratt's Manual," as it is sometimes called, which you can probably obtain in the public library or from your school biology department. To get the information you want, the procedure will be about the same for either of the books mentioned. It is easier if you take a map of the United States and then looking under Reptilia and under the range of each species in the book used, list all those whose range brings them within your state. This will really not be as hard as you may think at first. Also do not be dismayed by the technical names. They are not nearly so bad once you get used to them, and are absolutely necessary in the long run, as common names vary with each locality. Every now and then representatives of species are found in localities where they had not been thought to exist, thus

adding to their known range. Occasionally interesting variations in specimens are discovered, sometimes even forming new species or sub-species.

Any information of this kind should be carefully kept and when you are positive you are right, it should be forwarded to any large museum as they are always on the lookout for such data.

Now for identifying the more common species of your locality. This will take more time and should largely be a matter of personal observation. Nearly all the books in the Bibliography excepting the "Check List" will supplement what knowledge you already have. It is not difficult to learn to use a "key" in identifying specimens and that by Frank N. Blanchard is quite complete for snakes. Perhaps you will find it easier to use "Pratt's" once you become familiar with the scientific terms. This book covers all forms of American reptiles. Under the heading "*Identifying*" I have treated this subject more fully. Ditmar's "Reptile Book" you will find both interesting and useful in gathering facts about your local species. Van Denburg's two volumes, one on Snakes and Turtles, the other on Lizards, will be almost invaluable to western Scouts. They are exceedingly interesting and should be of help to any student of reptiles. Your list of the species found in your state will give you a working basis, then through field observation, which is by far the most interesting and Scout-like method, and through careful reading, you can compile the information needed for this part of the question. Don't forget, too, that museums, especially your local one, if there is such, are good places to see specimens and obtain information. Also your biology or science teacher will probably be glad to tell you all he knows about the subject, perhaps even to work with you in gathering information.

As an example of the first question let us take an eastern and a western state, New York and New Mexico, for instance. Yes, perhaps I'm helping the Scouts in those two states some, but as a Scout is friendly let's give them the benefit of it. In New York we find the following species:

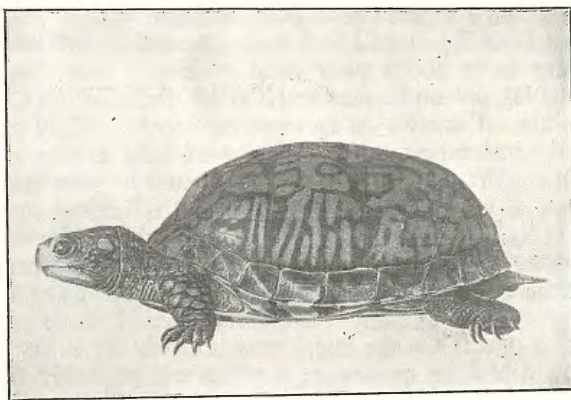
Crocodiles and Alligators—none.

Lizards—Only the Fence Lizard, the Blue Tailed Skink and Black Skink.

Snakes—The Worm Snake, Ring-Neck Racer, Hog-nose or Puff Adder, Smooth Green Snake, Black Snake, Pilot Black Snake, Milk Snake, Water Snake, DeKay's Snake, Red-bellied Snake, Garter Snake, Ribbon Snake, Copperhead, Massasauga and Timber Rattler.

Turtles—The Musk Turtle, Mud Turtle, Snapping Turtle, Spotted Turtle, Wood Turtle, Muhlenberg's Turtle, Blanding's Turtle, Box Turtle, Diamond-back Terrapin, Map Turtle, Painted Turtle, Soft-shelled Turtle, and occasionally along the coast, the Green Turtle, Hawk's-bill Turtle, Leather-back Turtle, and the Loggerhead.

This makes three species of lizards, fifteen of snakes and sixteen of turtles. As most of these are widespread in the state and easily distinguished, a New York Scout would be expected to identify and give some facts about at least two



The Box Turtle—From "Turtles of New England"

of the lizards, ten of the snakes and ten of the turtles. It may be interesting to state here, that at the Boy Scout Camps at Kanohwahke Lakes, in the Palisades Interstate Park region, New York, all of the above species are found with the exception of the Black Skink and Fence Lizard, the Massasauga Snake, the Mud, Diamond-back, Map and Soft-shelled turtles and the four marine turtles. He should also know that in New York State the Box and Wood

Turtles are protected by law at all times because of the rapid inroads made in their numbers by pot-hunters. How about your state? This should be of particular interest to Scouts.

Now for New Mexico, the western state, we have the following list of species:

Crocodylians—none.

Lizards—The Banded Gecko, Eastern Collared Lizard, Bailey's Collared Lizard, Leopard Lizard, Desert Gridiron-tailed Lizard, Band-tailed Earless Lizard, Western Earless Lizard, Rocky Mountain Tree Uta, Texas Tree Uta, Southern Brown-shouldered Uta, Sage-brush Swift, Striped Swift, Desert Scaly Lizard, Mexican Scaly Lizard, Yarrow's Scaly Lizard, Arizona Scaly Lizard, Baird's Scaly Lizard, Eastern short-horned Horned Toad, Arizona short-horned Horned Toad, Texas Horned Toad, Round-tailed Horned Toad, Glass-tailed Lizard, Sonoran Alligator Lizard, Gila Monster, Seven-lined Whiptail Lizard, Eastern Whiptail Lizard, Sonoran Whiptail Lizard, Texas Whiptail Lizard, Desert Whiptail Lizard, Sonoran Skink, White-spotted Skink, Prairie Skink.

Snakes—Eastern Worm Snake, Sonoran Ring-necked Snake, Western Hog-nosed Snake, Smooth Green Snake, Rough Green Snake, Yellow-bellied Racer, Whip Snake, Red Racer, Western Striped Racer, Eastern Patch-nosed Snake, Emory's Pilot Snake, Faded Snake, Western Bull Snake, Western King Snake, Arizona King Snake, Sonoran Milk Snake, Long-nosed Snake, Pug-nosed Snake, Spotted Night Snake, Woodhouse's Water Snake, Prairie Garter Snake, White-Bellied Garter Snake, Wandering Garter Snake, Marcy's Garter Snake, Mexican Garter Snake, Racine Garter Snake, Long's Garter Snake, Brown-spotted Garter Snake, Bicolor Ground Snake, Sonoran Tantilla, Sonoran Coral Snake, Edward's Massasauga, Black-tailed Rattlesnake, Desert Diamond Rattlesnake, Prairie Rattlesnake, Green Rattlesnake and Price's Rattlesnake.

Turtles—Sonoran Mud Turtle, Yellow-necked Mud Turtle, Cumberland Terrapin, Western Painted Turtle, Ornate Box Tortoise.

This makes a total of thirty-two species of lizards, thirty-

seven of snakes and five of turtles for New Mexico. However, you do not have to know the names of all those to pass the test. It's not as alarming as that. You should learn approximately how many species, each, of lizards, snakes and turtles there are, and should have a fair idea of what they are. If you know, for example, that New Mexico has several species of Collared Lizards, several Utas, about seven Swifts or Scaly Lizards, about four Horned Toads, one Gila Monster, about five Whiptail Lizards, several Skinks, and about seven other lizards, and can give the names of some of these species, you have a pretty fair idea of what lizards there are in that state. Then you should be able to do the same with the snakes and turtles. As this is a large state, varied in character, it would depend a great deal on where you lived as to what species you would describe as common. It would be reasonable to take those common in your own locality.

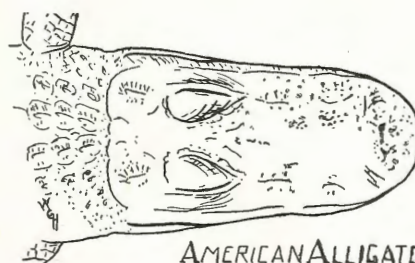
This should give you an idea of what you ought to know for the first question. Now get busy on the list of your own state—see how many species there are that should be included in it, and then try to find as many of these as you possibly can on your hikes and other trips.

Requirement 2. Know the distribution and typical life history of the crocodilians inhabiting the United States.

Of the many different forms of reptiles the members of the family *Crocodylidae* are probably among the most widely known. This is due partly to their large size and partly to their distribution which includes the rivers and marshes of nearly every country having a tropical or sub-tropical climate.

There are a number of genera in the family *Crocodylidae*, the majority of which are found in the Old World. Altogether there are about twenty species. In the Americas are found nine species, of which seven are confined to Central and South America, leaving only two species for us to worry about here. One of these is an alligator and the other a crocodile. It may also be of interest to state, that of the two known species of alligators, one is found in America and one in China!

Technically there are several different ways of distinguishing between alligators and crocodiles of the United States.



AMERICAN ALLIGATOR

To the average person the most apparent characteristic is the shape of the head. In the crocodile it is long, rather narrow, and more or less pointed at the snout, while in the alligator it is much

broader and rounded at the snout. (See illustrations.)

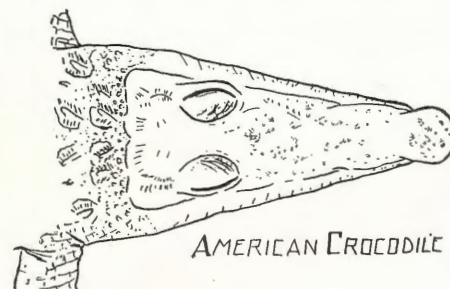
The range of the crocodile in the United States is limited to extreme Southern Florida and possibly Texas. That of the alligator embraces rivers and swamps along the Atlantic lowlands from North Carolina, south through Florida, and from thence along the Gulf to the Rio Grande in Texas.

Both the crocodile and alligator in a wild state, are fast disappearing, due to the steady advance of civilization into the more remote regions, as well as to the commercial use of their skins in making fancy

leather articles. Many alligator farms have been established in the United States and make a successful business of selling the skins to commercial houses, and young alligators to research laboratories and tourists.

Alligators and crocodiles feed upon fish, frogs and other water life, and upon mammals and birds that come within reach, especially water fowl. In the United States man has personally little to fear from these reptiles which have a great dread of human beings. It is in Africa and India that the "man eaters" are found.

The breeding habits of American crocodiles and alligators differ. The alligators lay their eggs in June in so-called "nests." These are either in natural piles of leaves, reeds



AMERICAN CROCODILE

and other debris, or are more often especially constructed for the purpose. They may be either quite large and noticeable, or nearly inconspicuous, depending on various conditions. The female digs out a hole in the "nest" and deposits her eggs. After this they are covered with the material taken from the hole and left to hatch. The incubation is hastened somewhat by the heat of the sun and of the decaying vegetation. The temperature inside the "nest" seems to remain quite constant, both during the hot days and cooler evenings. The eggs usually number from thirty to forty. They are oval in shape, about three inches long and half that in diameter, and are covered with a hard white shell. They hatch in about eight weeks, after which the young crawl to the surface and commence to shift for themselves.

The American crocodile, on the other hand, simply digs a hole in the sand near its haunts, in which to lay its eggs. Some species of crocodiles have even been observed to return to their nests and assist the young in breaking loose. The alligator does not do this.

Raymond Ditmars in his "Reptile Book" says that at birth an alligator is about eight inches long and that under favorable conditions it grows at the rate of a foot a year or possibly even more in the early years of its life. One in his possession was five feet, six inches long at five years of age and weighed fifty pounds. They probably reach maturity within a comparatively few years. Contrary to popular belief a twelve foot specimen need not be of great age. That they will live a great many years, however, is not doubted. This, in brief, is the life history of these saurians.

Requirement 3. Be able to distinguish the poisonous reptiles of the United States.

- (a) *The one kind of poisonous lizard.*
- (b) *Four kinds of poisonous snake, by shape, size, markings, heads, tails or by teeth (fangs).*
- (c) *The location and operation of the fangs of the four kinds of snake.*
- (d) *General distribution of the poisonous form.*
- (e) *Whether these poisonous snakes are aggressive or defensive, and how far they can strike.*

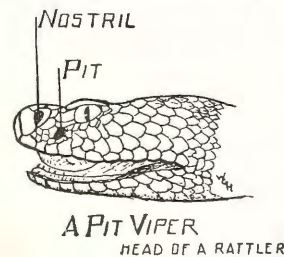
To the popular mind the poisonous snakes of the United States are easily divided into four main groups,—the Coral Snake, the Water Moccasin or "Cotton-Mouth," the Copperhead and the Rattlesnake. The first of these, a small bright



A Dangerous Looking But Harmless Snake—The Puff Adder or Hog-Nose Snake.

colored snake, belongs to the same family as the Cobras of the eastern hemisphere. There are two species of Coral Snakes in the United States and several others in Central and South America. The Water Moccasin and Copperheads are related to each other and these two species, together with about fifteen species of Rattlesnakes in the United States, make up a larger group, commonly called "Pit Vipers." This name is due to a hole or pit in either side of the head

of these snakes, situated between the nostril and the eye. Although the inside lining of this pit is known to contain nerve cells, its function is still undetermined. The American Pit Viper includes several South American species, such as the Bush-master and its relatives. There are a few Pit Vipers in Asia.



Distinguishing Poisonous Snakes.

"Be able to distinguish by their shape,"—yes, the first answer will probably be that since they are poisonous, they have triangular heads, but this is *not necessarily true!* Let us take first of these four, the Coral Snake. Though possessing poison that, quantity for quantity, is far more deadly than that of any rattler, its head is certainly not triangular. In fact, there is hardly any distinction between the head and the body, not nearly as much as in the common Garter Snake. Then, too, I have seen harmless water snakes flatten their heads till they look more deadly than any "Cotton-mouth" normally looks.

All poisonous snakes in America, except the brightly Colored Coral Snakes, may be readily distinguished from the harmless varieties by their possessing a facial "pit" (see page 9). If a snake has four "nostrils" look out for him. The second more posterior pair of "nostrils" are facial "pits," and label this snake as dangerous. Three of the four groups have this distinctive characteristic.

The four classes of poisonous snakes found in the United States can be further distinguished as follows:

I. Brightly marked, and without a "pit":

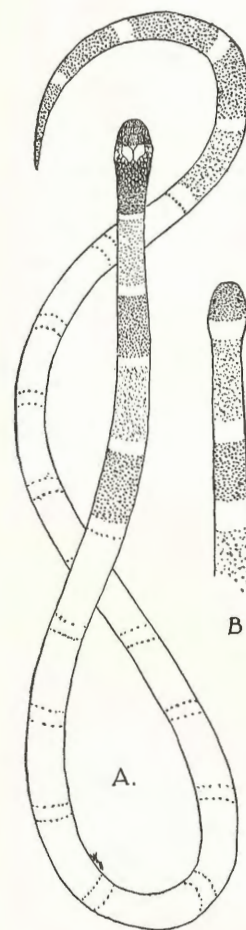
Having bands of red, yellow, black and yellow, in that order, and with a black snout—Coral Snakes.

II. A "pit" between each eye and nostril:

1. A rattle on the end of the tail—Rattlesnakes.

2. No rattle:

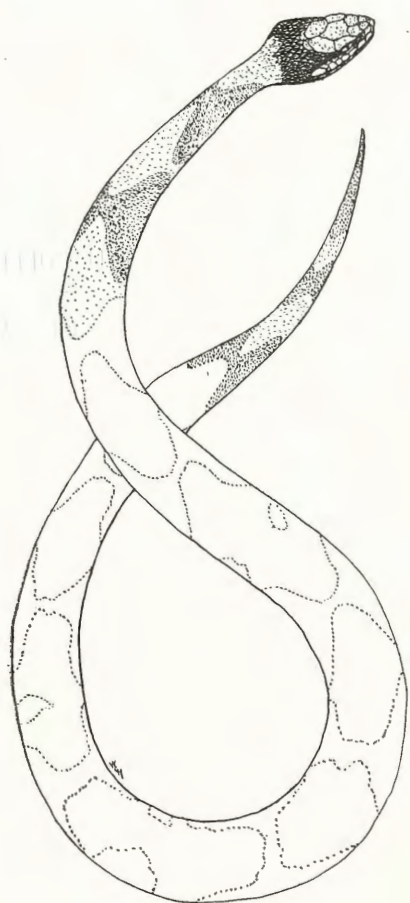
- a. Cinnamon or coppery color with 15 to 25 darker dumbbell-shaped markings across the back. Head without noticeable markings—Copperhead.
- b. Dull olive or brown with 20 to 30 indistinct dark bands. Upper lips yellowish. Dark band back of eye with light streak over this—Water Moccasin or "Cotton-mouth."



A. Coral or Harlequin Snake
B. Western or Sonoran Coral Snake

The *Coral Snake* has a cylindrical body usually less than three feet long and is vividly marked with rings of black, red and yellow. It may be distinguished from the several species of similarly colored, harmless snakes found in the United States, by the arrangement of the colored rings. In the Coral Snake these run in the following order: red, yellow, black, yellow, and repeated. Also the end of the snout is black in the two species of this snake found within our borders. This group, which belongs to the same family as the Cobras, has grooved teeth or fangs situated in the front of the upper jaw. These are solidly fixed at about right angles to the maxillary bones which are immovable, unlike those of our other poisonous snakes that hinge, folding the fangs back in the mouth. The fangs of all this family are proportionally shorter than those of the *Viperidae* which include the Rattler, Copperhead, Water Moccasin as well as many Old World species. Due to this smaller size, the permanently erect fangs can be accommodated in the reptile's mouth. Quantity for quantity, the poison of this group is probably more deadly than that of all other American groups.

The *Copperhead* is a much stockier snake than the one just described and the body is less cylindrical. The head is distinct from the body and its usual reddish brown or rather copperish color has given rise to the name. Similar to



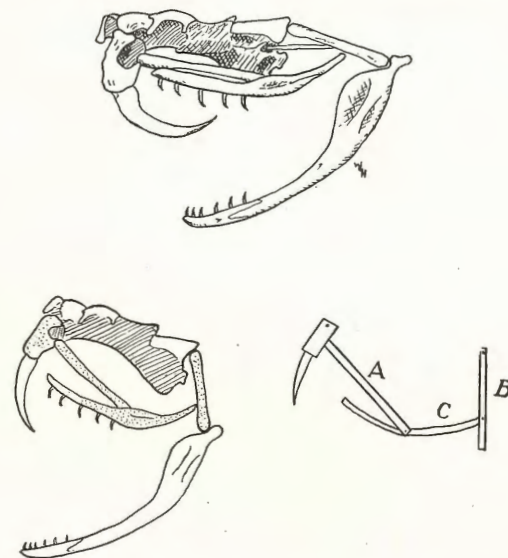
Copperhead

that of the head is the ground color of the body which is broken up by about fifteen "hourglass" or "dumbbell" shaped saddles crossing the back and extending down the sides to the belly. The tail is rather short and tapering. The eyes of this species, as well as the Moccasins and Rattlers, have vertical pupils like a cat's eye, rather than round, as in the case of many other snakes. A little below and in front of the eye may be found the "pit." The fangs of the Copperhead are typical of the Pit Vipers, though not as long, comparatively as some of the others of this group. They are curved hollow teeth connected at the top by a duct with the poison glands and open at the bottom like a hypodermic needle. Each fang represents a tooth which was originally grooved but during evolution the edges have folded over until they meet to form a tube. These teeth are firmly fixed to the maxillary bones which hinge in front and are controlled in a manner best described in the accompanying illustration. They are swung forward when in the act of biting by the combined

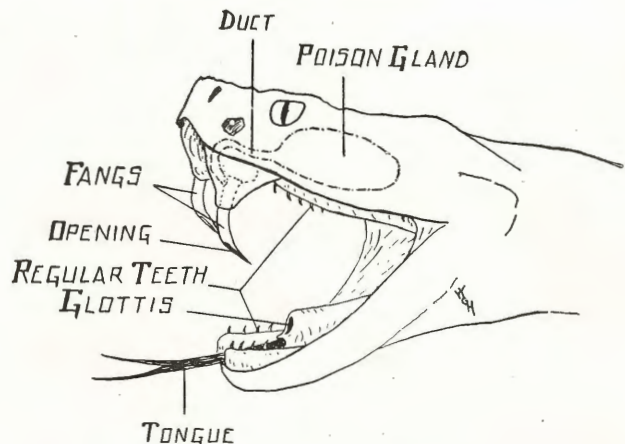
action of the three bones (A, B and C), and the various muscles attached to them. At the moment the snake strikes, the lower jaws close on the object, and muscles squeeze the poison glands, forcing venom into the wound.

After the fangs are embedded, the snake pulls on them momentarily, then disengages them and draws back on the defensive again. Sometimes a snake misses the object aimed at and two jets of poison are thrown from the fangs, even to

a distance of several feet. There is no spitting done, however. It is simply due to the force with which the poison is squeezed out of the glands at the moment the fangs would normally become imbedded in the flesh. All this, of course, happens almost instantly and is more or less automatic. Nevertheless the fangs do not have to be raised with the opening of the mouth, as when swallowing prey; though they often assist in this process. When not in use the fangs fold back and are covered with a sheath of membrane that slips over them. A poisonous snake cannot be rendered harmless by pulling out the fangs, as there are a series of others continually growing under the membrane. Thus when the fangs

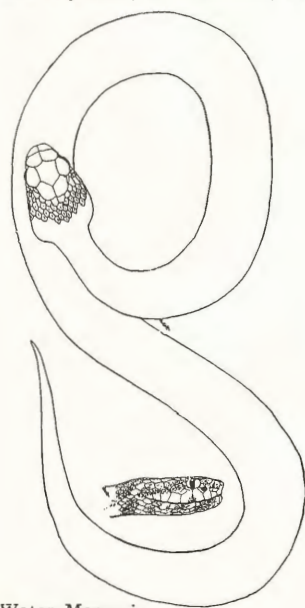


Thus when the fangs



DIAGRAMMATIC HEAD OF A RATTLER

are injured or removed, new ones are ready to replace them within a few days. The fangs are also shed periodically, the new ones growing beside the old before it becomes loosened. This accounts for the double fangs often seen in one side of a poisonous snake's mouth.

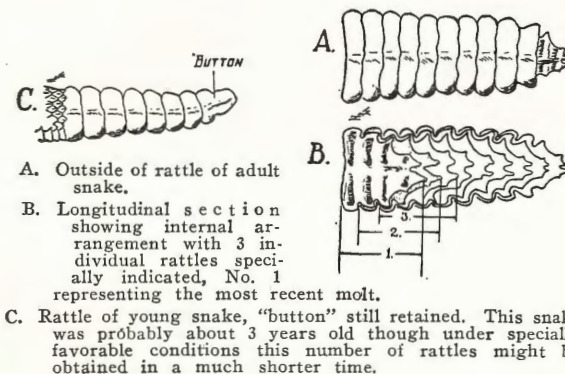


Water Moccasin

The *Water Moccasin* is a heavily built snake of a dirty olive brown color crossed by twenty to thirty rather obscure dark bands. The head is large and distinct while the tail is tapering, and, all in all, this snake lives up pretty well to the popular idea of a poisonous snake. The upper lips are yellow and a dark band runs back from the eye to the angle of the mouth, the interior of which is quite light

in color and has given rise to the name "Cotton-mouth."

There is no need to tell what characteristic determines the *Rattlesnakes*. Their rattle is unique among reptiles. No other form possesses it. The rattle is merely the tail portion of a series of moults or shed skins which have stuck to the end of the tail instead of being thrown off with the rest of the moult. As each piece is dry and held only loosely in



A. Outside of rattle of adult snake.

B. Longitudinal section showing internal arrangement with 3 individual rattles specially indicated, No. 1 representing the most recent molt.

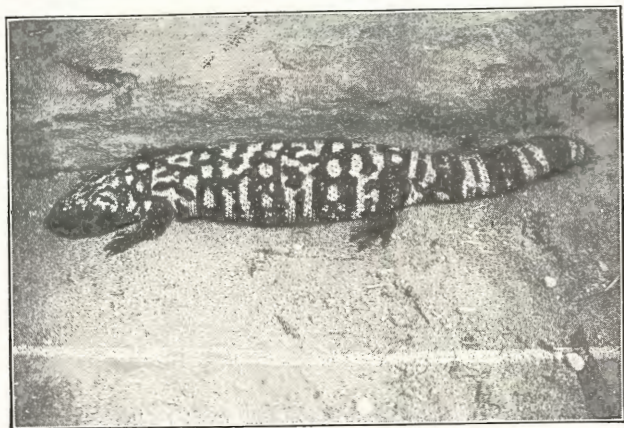
C. Rattle of young snake, "button" still retained. This snake was probably about 3 years old though under specially favorable conditions this number of rattles might be obtained in a much shorter time.

place, the whole structure makes a rustling noise when shaken. At birth the baby snake possesses what is commonly called a button. When the snake sheds its skin this button remains on the end while the fleshy tail is pulled slightly out, anteriorly. This happens at each subsequent shedding and at each a new section of the rattle is formed. As the rattle becomes longer those sections on the end are apt to break off. This, coupled with the fact that a new one is formed every time the snake sheds (several times a year) shows the fallacy of trying to determine a snake's age by the number of sections to the rattles. Like the "Pit" the use of the rattles has never satisfactorily been demonstrated, though numerous ideas have been suggested. However, they serve the purpose of giving a warning to man and as such we appreciate them.

In other respects the *Rattlesnakes* are not particularly noteworthy. They are Pit Vipers, rather stout snakes, with distinct heads, and a variety of patterns according to the

species, of which there are about fifteen in the United States and several in South America.

I might add here that the only Poisonous Lizards found in the United States, or, for that matter, in the world, are called Gila (pronounced "Heela") Monsters. There are



Gila Monster—From "Reptiles of the World"

only two species, one being found in the deserts of our southwest, and the other in Mexico. They are quite similar, with heavy squat bodies mottled with an orange or reddish color, and black. The skin is quite characteristic, having a very beaded appearance. These reptiles do not have fangs like the poisonous snakes, but rather, a series of teeth are grooved in the lower jaw. This allows the poison, which mixes with the saliva, to work into the wound, the lizard meanwhile holding on with bulldog-like pugnacity.

Are Snakes Aggressive?

Reptiles all have a certain amount of personality, and vary in individual temperament. Nearly all poisonous snakes, however, bite only in self-defense and in securing food. There are only two or three that are really aggressive, the King Cobra of India being one of the noteworthy examples. The water snakes, on the whole, have more nasty dispositions, and are less to be trusted than our other common species. The Copperhead usually minds its own business

and tries to get out of man's way, but if approached too closely it gives no warning before it strikes. The Rattlesnake has sometimes been called the "gentleman among snakes." He will avoid trouble whenever possible but also expects you to do your share. His rattle usually serves as warning of trouble. (See Illus. head of Page 1.) The Coral Snake is secretive and not very commonly met with. It has, however, a rather uncertain disposition and its bite has proved fatal in three-fourths of the cases reported!

No snakes can strike accurately for more than half their length and normally strike at a shorter distance. On being teased or when very angry, a snake may strike wildly up to about two-thirds of its length. None are able to spring or to throw themselves at a victim. Neither have we any that will spit poison. There should be little need of mentioning that the forked tongue, sometimes called a stinger or even a fang, has nothing whatever to do with poisoning. It serves primarily as a feeler or air taster, much as an insect's antenna.

General Range of Poisonous Snakes in the United States.

The Rattlesnakes range generally throughout the United States. The Copperhead is found particularly in rocky or moist places throughout the eastern states and west as far as central Illinois, Kansas, and the Texas Panhandle. The Water Moccasin is found in lowlands from southeastern Virginia to Florida, up the Mississippi Valley to southeastern Missouri and southern Illinois, west to central Texas and up the Rio Grande to the Pecos River. The Eastern Coral Snake is found to range from eastern North Carolina, south through Florida, west through Alabama to southeastern Missouri and south through central Texas, while the Sonoran species covers southern New Mexico and Arizona.

Requirement 4. Know eight harmless snakes, four of which feed on destructive rodents, and know the food of each. Know how they capture and eat their food. Know something of the usefulness of the snake to man. Know how young snakes are produced—from eggs or living young; how and why a snake sheds its skin; why snakes are partly blind prior to shedding; the function of the snake tongue.

The food of snakes necessarily depends on their respective habitats and sizes.

Water Snakes live on fish, frogs, crayfish and other animals that they find in or near the water. The Green Snakes, on the other hand, being much smaller and living among the grasses and shrubs in the fields, feed on grasshoppers, spiders, snails and the like. DeKay Snakes, living under logs and rocks and in debris, feed largely on slugs, snails, earth-worms and insect larvae. The Puff Adder has a particular taste, in that it lives almost entirely on toads. However, the majority of our snakes feed on warm-blooded animals including some birds, but mostly rodents such as rats, mice, ground squirrels and rabbits, many of which do great damage to crops, orchards and young trees. Snakes will not usually take anything dead, though in Zoological Parks they become accustomed to the freshly killed food offered them. They carefully stalk their prey until within striking distance and then seize it with a lightning-like thrust. Some of our snakes, such as the Pine Snake, Chicken Snake, King Snake and Mountain Black Snake (not the common Black) kill their prey by tightly coiling about it, constricting it as they hold it in their mouths. The others simply proceed to swallow the unlucky victim alive. In the case of poisonous reptiles, if the prey be large, it is struck and then allowed to die, which is usually almost instantly, before being grasped and swallowed.

One might well wonder how a small snake, less than a foot long, could swallow a mouse, and yet many can, and do. One small Rattler that was in my possession for several months, was fed about every two weeks with a mouse not quite full grown. This snake was not particular and would take dead mice when placed in its cage. If a dead mouse was moved around with a piece of string tied to its tail the snake would stalk up to it, then seize it, making no attempt however to strike, apparently knowing that something was wrong with the animal. Nevertheless on two occasions when live mice were placed inside, it struck and poisoned them, then waited till they were dead before proceeding to swallow them. Though the snake at this time was less than a year old, and not twelve inches long, the first victim (nearly adult) died in thirty-five seconds and the other in ninety. Probably the fact that the first was

struck near the head and possibly in a vital spot accounted for the rapid action of the poison then, but the second was struck in the fleshy part of the thigh. As soon as the mouse was dead the snake nosed about for the head, then worked its jaws over it as far as possible. By working one lower jaw forward and back, then the other, it gradually drew the food in. The mouse was much larger than the snake's head or any part of its body, but to allow for this the two halves of a snake's lower jaw are connected in the front by an elastic ligament that allows them to separate. The process of swallowing a mouse sometimes took twenty minutes or more and did not seem to be a very pleasant operation for the snake. Then a swelling could be seen about half way down its body where the mouse, swallowed whole, remained until digested. If the snake was accidentally disturbed in such a condition, it disgorged its food so as not to be helpless with its mouth full and weighted down. Sometimes after this occurred it would once more, when left alone, begin to swallow the mouse. Once when the mouse proved especially large it was disgorged and was not touched again.

As for a live mouse being disturbed when placed with a snake,—not at all! Time and again I have seen mice run all over both poisonous and harmless varieties, much to the snake's apparent uneasiness, or sit on the reptile's coils and wash their whiskers or even dine off a Rattlesnake's rattles! Snakes are often afraid of their natural prey when in strange surroundings, and do not attempt to eat, or even to protect themselves, though the mice will sometimes attack and kill their reptilian enemy. Certainly most animals show no instinctive dread of snakes, as so many people believe.

Know Eight Harmless Snakes.

The requirement also says to know eight harmless snakes, four of which feed on destructive rodents. This should not be hard to answer, possibly even from the list of snakes in your own state. Any but our four poisonous ones would do for the first part and certainly you can get four others that will qualify for the rest of this requirement. There are many cannibal snakes that eat any of their fellows that they can engulf. The King Snake is a famous example especially since it is appar-

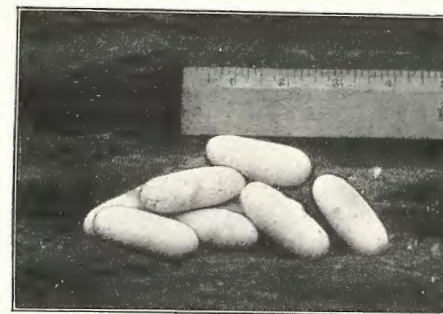
ently immune to snake poison. It strangles and swallows any smaller snake it meets when hungry. However, these cannibals usually eat rodents too, when opportunity offers, and so may also be included in the list.

It is needless to say that snakes which destroy rodents do a valuable, good turn to man. Every Scout knows something of the destruction caused by rats and mice. Those who live in the country have seen orchards almost ruined by mice and rabbits gnawing the trees. They know of grain destroyed in field and barn, and of stock injured from gopher holes. Any snake that eats insects would also be of value to man. While some snakes eat birds and their eggs, this damage is probably more than made up for by their inroads on those animals that are serious pests. Water Snakes largely destroy frogs and fish, though in negligible amounts. The Puff Adder also spoils its record by feeding on toads to a great extent. Yet even this would hardly warrant the destruction of this species unless it were quite numerous in some local districts. Even the poisonous Rattlers and Copperheads do a large amount of good in the number of rodents they destroy and on a cold-blooded economic basis probably greatly over-balance the damage they do in occasionally poisoning man. This view of them, however, cannot be taken in cases where they are abundant and where man's life might be at stake. Whenever these reptiles are a menace to life we must overlook the good they do.

Snakes have many peculiar adaptations of their own, though fundamentally they are like other animals. They must eat, drink, digest their food, manufacture energy, and breathe as does every animal, and they must produce young to live after them. Many of these processes, however, are modified or are totally different from those with which we are more familiar. Eating is apparently not particularly enjoyed. In drinking, the reptile virtually immerses his whole head in order to suck up the water. The digestive apparatus in snakes is unusually powerful, the juices dissolving nearly everything but the fur and feather of the prey. Even bone is dissolved. Due to the shape of the animal there is only one lung developed, the left one, which extends far down in the body, in a long tube shape.

How Young Are Produced.

The young of snakes are produced in two ways. Some snakes lay eggs, and in others the young are born alive. As in every higher animal, it is necessary for the microscopic sperm cell to unite with the egg cell. In all reptiles this union takes place in the body of the female and is therefore spoken of as "internal fertilization"; while in most frogs and some other amphibians it takes place in the water and is called "external fertilization." The egg cells



Eggs of Black Snake—From "Reptile Book"

then begin to grow and in some species of snakes they are soon laid, covered with a more or less leathery shell. The eggs of snakes are hidden under rocks, decaying logs or other places of concealment where they will be warm and slightly moist, and then left to hatch, after which the young shift



Mother Garter Snake and Newly Born Young—From "Reptiles of the World"

for themselves. In other species, however, the eggs develop into young while still inside the body of the parent, but enclosed in a thin membrane. The young are nourished from the yolk as in the first case, but are not laid or born until ready to burst through this transparent covering. In this case, too, they look after themselves as soon as they break out of the membrane. Those snakes that lay eggs are called *oviparous*, while those that retain the eggs until ready to hatch, as you might say, are called *ovoviviparous*. Some examples of snakes that bear living young are the Garter Snakes, the Water Snakes and the Pit Vipers of the United States. Most of the others lay eggs, such as the Black Snakes and other "Racers," the Green Snakes, the Milk and King Snakes and the Bull Snakes.

Snakes Are Partially Blind Whenever They Shed.

Snakes shed their skins one or more times a year, usually about twice. Since the outer covering of the skin does not grow with the animal it must occasionally be replaced. In young animals, the frequency depends on the rate of growth, and this on the food supply; but in older animals the skin is shed when it becomes worn, dirty, and injured. Just previous to this change the reptile's eyes become cloudy and whitish making it temporarily blind. This is because the eye plates, which are also shed with the skin, are loosening up, leaving an air space between them and the new plates. Snakes like to soak in water before shedding as this helps to loosen the skin. The period seems to be a critical one in the life of the serpent as captive specimens sometimes die if they cannot shed properly. When ready to shed, the animal crawls through branches or other objects against which it can rub. The skin loosens first around the mouth, and is peeled back, inside out, over the head just as we would remove a tight glove. The discarded skin is thin and shiny, showing every scale and feature of the reptile except that it is either pig-

mentless or has the barest suggestion of a color pattern. In the meantime the snake has a new skin glistening with freshness and brilliancy of color. It is very delicate, however, and subject to injury till it dries and toughens within a few hours.

Requirement 5. Know some of the important differences between the groups (snakes, lizards, turtles, crocodiles) as to (a) eyes, (b) ears, (c) teeth, (d) heart, (e) lungs, (f) limbs, (g) tails, (h) scales (shell).

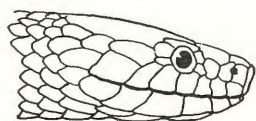
The Difference Between Snakes and Lizards.

You probably wonder why you are asked to know the difference between lizards and snakes as to eyes and ears. I wonder if you know that some lizards have no legs or feet at all, and are slim and long like snakes? Some of these are found in the United States and it is difficult to distinguish them from snakes. The first and constant distinction is that the bones of the lower jaw are firmly united in the front in lizards and are loosely attached in snakes.

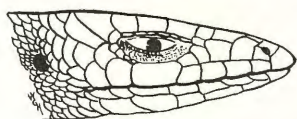


A Legless Lizard—From "Reptiles of the World"

Another distinction is that almost all lizards have movable eyelids,—eyes that can shut. Not so with the snakes. These must sleep with their eyes open, literally. Their eyes are protected by watch glass shaped coverings, but cannot be closed. The next difference is the matter of ears. Look at a snake's head. Where are its ears. It hasn't any that show on the outside. Inside the head are bones that correspond to ear bones but it has no ear openings outside. Sound



RING-NECK SNAKE



BLUE-TAILED SKINK

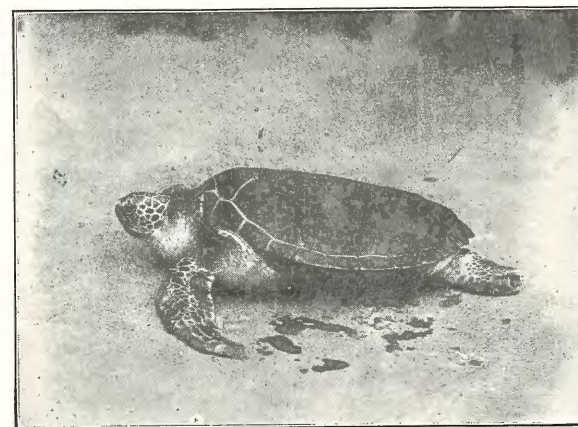
Head of a Snake and of a Lizard
Showing Difference in Eyes and
Ears.

vibrations are not received through a tympanic membrane but are picked up mainly by the head and body from the ground. The jaw bones are also connected with the ear bones and assist in transmitting vibrations. In the case of most lizards you can see an opening back of the eye, sometimes covered or partly covered with scales, which is the ear opening. The tongue of both snakes and lizards is similar in appearance and function. It is, however, more often seen and remarked on in a serpent. As I have previously mentioned, the tongue has nothing whatever to do with stinging and poisoning. It is soft and flexible, more so than your own tongue, and serves largely as a feeler or better, a taster of the air. A snake will often work around an animal it is going to eat, touching it here and there with its tongue, usually to locate the head. Because of its delicacy, the tongue may possibly be sensitive to heavy noise vibrations, but it cannot be said that a reptile hears with its tongue. A lizard will sometimes use its tongue, which is often much wider than a snake's, to lap up water or other substances, or even to catch insects. In the true chameleon, which is found in Africa, the tongue is remarkably developed so that it telescopes when drawn in, and when protruded is almost as long as the lizard itself. As the end of it is sticky, it serves admirably in catching insects at a distance. None of our American species have anything of this sort however.

Requirement 6. (a) Know the typical life history of turtles, including where and when the eggs are laid, the number, color, shape and covering, and period of incubation. Recognize and describe five kinds of turtle, one of which shall be edible; OR—Requirement 6 (b)—see page 28.

Many different reptiles are edible, though it may take

courage on our part to make such use of them. In Central and South America the common "Iguana" is esteemed fine eating by the natives and even the white people. The same is true of many lizards and snakes in other parts of the world. Turtles are prized as food almost universally. In this country the most commonly used are the Green Turtle,



Green Turtle—A Marine Turtle Famous for Soup

Diamond-back Terrapin, Snapping Turtles, and certain species known popularly as "Sliders." These may often be seen in the markets especially of the south. Diamond-back Terrapins are now raised extensively on "turtle farms." Though having little commercial value, many other species of turtles can be, and are, used. As was mentioned before, the Box Turtle and Wood Turtle are both protected by law in New York because of the many people hunting them for food. The flesh of the Box Turtle has been known to cause sickness when eaten, probably because it was tainted by mushrooms of which this turtle is very fond, apparently with no ill effects to itself. Nearly all the water turtles can be eaten. A musky or fishy taste is sometimes a drawback in these species. Perhaps you have heard of Snappers being kept in swill or garbage barrels to fatten them. This is sometimes resorted to in country places, apparently with success.

In answering this question take, if possible, four turtles found in your locality while the fifth and edible one may or may not also be a local form. The value of knowing an edible turtle that you can find in your own section will make you just that much more self-reliant should necessity arise. Perhaps you already know of such a turtle, or if not, a little inquiring on your part will probably disclose the infor-



Diamond-back Terrapin—A Salt Marsh Species

mation you want. New England Scouts or for that matter any eastern Scouts, will do well to read Harold L. Babcock's "Turtles of New England." Besides having a good description of these turtles, illustrated with fine colored plates, it gives many interesting notes on their various habits and economic value.

All the turtles, whether marine, fresh water or land, are alike in one thing. That is they lay their eggs on land, buried in holes that they dig for that purpose. As a rule the eggs have a hard, white or light colored shell. They may be oval or spherical according to the species and may vary in number from less than ten to over a hundred or sometimes a great many more. Ditmars says that the Loggerhead lays from fifty to a thousand depending on the size and age of the female. Marine turtles lay their eggs on sandy beaches in the tropics. Most of our inland turtles lay their eggs in the



Snapping Turtle Eggs and Newly Hatched Young

soil or debris where it is slightly moist and where the warmth of the sun will help them to develop. Turtle eggs hatch as a rule in from two to three months, after which the young turtles crawl to the surface and begin life's tasks by themselves. An interesting observation is recorded by Babcock on egg laying by Musk turtles in the rotten ends of upright logs.

As a whole little is known of the intimate habits of turtles and gathering accurate data would be an interesting pastime for Scouts who have patience and who like to be outdoors. Though it is often the chance observation that is most unusual, no opportunity should be lost. I might say here that this same thing holds good in practically all phases of amphibian and reptile life. There are many little points that are waiting for some sharp eyed observer to disclose.

In many cases the length of time it takes eggs to hatch is still unknown, and, with some species, even when and where the eggs are laid is a question for Scouts to answer for science.

Requirement 6. (b) Know the typical life history of lizards; how young are produced—from eggs or living young. Recognize and describe five kinds, preferably common to his own region. Know the common food of lizards and their usefulness to man in thus controlling pests. Know how and why a lizard will drop its tail and how it regrows.

Life History and Food of Lizards.

In temperate regions with cold winters, lizards hibernate during the cold part of the year, during which time no food is taken, but food that is stored up in the body is slowly used to sustain life. In this condition, they are cold and stiff and seemingly lifeless. When going into hibernation they seek holes in the ground or shelter under logs, rocks or trash where they get some protection.

In the spring, they come out thin and hungry and immediately hunt for food. Most lizards eat insects and may thus be of great service to mankind in helping to prevent the insects from becoming too numerous. Many of them also eat spiders. There are a few in our country, like the chuckwalla and crested lizards, that feed on plants, usually taking the soft tender buds, leaves, flowers or fruits. There are some, like the leopard, ring-neck and the desert scaly lizards that will eat other lizards or small snakes. The Gila, pronounced Heela) monsters probably eat bird or reptile eggs or perhaps the young. This is inferred because they readily eat hen's eggs in captivity. Some lizards, like the skinks and legless forms, burrow into the ground, feeding largely upon insect larvae or worms.

Mating usually occurs in late spring or early summer after recuperating from the winter hibernation, the dates of those known ranging from late April to early June, perhaps earlier than this in the south. The eggs which are developed are in most cases deposited during the summer, some as early as June and others as late as August or September. In such cases, the female scoops out a hole in the soil or sand and deposits the eggs at the bottom, usually several in number.

After covering the eggs deep enough so they will not dry out too much, she leaves them for the sun to hatch. This usually takes a few weeks.

In a few cases, like the horned toads (which are really lizards and not toads) and some of the Sceloporus lizards, the eggs are cared for by the mother inside the body until they are ready to hatch, so that when the eggs are deposited, the young lizards immediately break out of the egg shell and we say they are born alive. This is very different, however, from the mammals in which the young before birth are fed more and more as they grow instead of storing up all of the food needed in the egg as in the case of the birds and reptiles.

The young lizards must take care of themselves right from the first. Even in those cases where the young are born alive, the mother never takes care of them. Most of them feed upon small insects or spiders until they go into winter hibernation when about one-third or one-half grown, and finish their growth the next season.

The Lizard Tail

With most lizards, the tail is a fragile thing which can be thrown off by the lizard itself when necessity arises. If caught by the tail by one of its enemies, such as a striped racer snake, the tail will be left wriggling in the snake's mouth for it to eat, while the lizard scampers to safety. This is accomplished by the sudden pulling of a bundle of muscles on one side of the tail which makes a sharp bend in it and breaks the bone in two at the middle of a vertebra, and not at the joint. The bone, having been broken at the middle where a strip of cartilage occurs, begins to grow from the cartilage, making a cartilage rod around which new flesh and skin build, the whole thing gradually getting longer and longer until it reaches normal size.

Some lizards, such as the chuckwalla and Gila monsters, however, cannot throw the tail in this way. The chuckwalla use their tails in defense, sometimes striking swift blows with them. The Gila monster tail is believed to be of use in storing away surplus food in the form of fat.

Recognize and Describe Five Kinds.

Consult books on reptiles of your own state to become acquainted with the common lizards of your own locality.

Requirement 7. Know the relative position of reptiles in the animal kingdom.

Explain why, where and when reptiles hibernate, and the duration of the hibernation period.

The Animal Kingdom includes animal life ranging from tiny one-celled creatures, through to the higher mammals and man himself. It is divided into two large groups: invertebrates and vertebrates, animals which have no backbone, and animals which have. The latter group is again divided into five parts: fishes, amphibians, reptiles, birds and mammals. It is with the position of reptiles with regard to the other four that we are concerned. The groups are arranged according to their structural relations. The reptiles are more highly developed than amphibians, and birds and mammals are higher than reptiles. Moreover the fossil record shows that animals evolved in the same order, fish being the first vertebrates, from which sprang the amphibians. These in turn gave rise to the reptiles. It is certain that birds and mammals developed from two distinct branches of reptiles. Scouts to answer this question well should study the evolution of life as demonstrated in the larger museums.

Reptiles Become Inactive When Cold.

Reptiles are not found in colder countries such as northern Canada for the simple reason that they would sleep, or hibernate, as it is called, all the time. This naturally would not do. Reptiles are more abundant in the tropics and the number of species diminishes as you work north or south from the tropics. They are said to be "cold blooded," that is, their blood and body temperature is the same as that of the inanimate environment. The colder they get, the more sluggish they become; eventually they reach a stage where the body functions, such as breathing and circulation of blood, decrease to the point where they are merely sufficient to keep the inactive body alive. Some reptiles can even stand being frozen for a short period. As all the machinery slows down, so to speak, on cooling, it is not necessary to secure much oxygen or to use up much fuel. Thus nature has provided the reptiles of temperate climates with the instinct to search out a protected place where they can hibernate during the winter with little danger of becoming too cold

or of being molested. Snakes and lizards, as a rule, crawl under leaves, soil, or debris, or in crevices deep down in the rocks. Some snakes, like the Rattlers, congregate in large numbers in so-called "dens." Turtles, on the other hand, dig down in the mud of their native streams or ponds, or into damp soil if they are land species. Reptiles may be seen sunning themselves on warm days in the fall, but as soon as it gets cold they suddenly disappear, not to be seen again till the sun has warmed the earth in late spring. In the vicinity of New York, snakes go into hibernation about November and the majority do not come out again until May. This period, of course, varies with the severity of the winters in any locality.

Requirement 8—Know what First Aid treatment should be given in case of poison snake bite, and the reasons for the same.

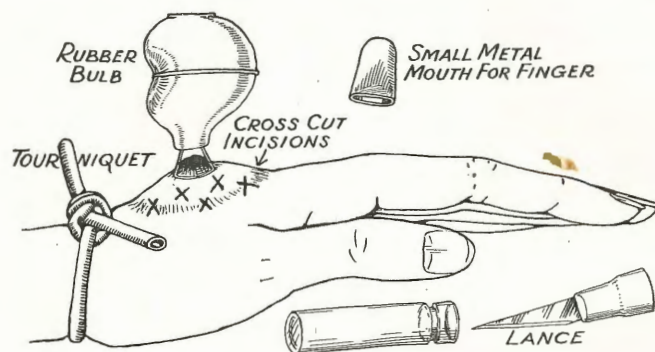
The following suction method of First Aid treatment for snake bites is the discovery of Dr. Dudley Jackson of San Antonio, Texas, and Col. M. L. Crimmins. It has been thoroughly tested, rechecked, approved and recommended by the U. S. Public Health Service at Washington, D. C.

(1) Quickly apply a light tourniquet $1\frac{1}{2}$ inches to 2 inches above the wound. This tourniquet should not be tight enough to stop blood from coming into the part. As the swelling moves up, the tourniquet should be moved slightly, so as always to keep ahead of the swelling. Almost anything may be used for the tourniquet, from a shoe lace or piece of string to a regular strap or rubber bandage.

(2) Quickly join the two fang marks by cross incisions— $\frac{1}{4}$ inch deep and $\frac{1}{2}$ inch long with a sharp lance or knife point. Other incisions of this size should be made around the swelling which develops. (Great care should be used not to cut into a vein.) Squeeze gently and rub toward the wound to encourage bleeding. Warm water may be poured on the wound by some other helper, thus also encouraging bleeding.

(3) Suction should be immediately applied, preferably with a suction bulb (as illustrated), with a heated large

mouth bottle or other suction device, or with the lips if necessary. (In such case, if at all possible, a tube should be used, so that the mouth will not come in direct contact with



the wound.) Suction should be continued for a half hour and repeated for fifteen to twenty minutes during each following hour.

(4) Wet antiseptic dressings which will keep the wound open and draining should be applied between the suction periods.

(5) The patient must be kept quiet, as movement stimulates circulation and favors the spread of the poison.

(6) Send for a doctor at once. If possible to move patient easily to doctor or hospital, do so, but do not interrupt First Aid treatment.

The success or failure of the treatment depends to a great degree on the mental condition of the patient. It is undoubtedly true that fright kills many people who have suffered only from the bite of a non-poisonous snake. Therefore, it is important to endeavor to keep the patient in good spirits, at the same time, however, keeping him as quiet as possible.

In addition, let someone in the party kill the snake if he can, in order that the doctor may identify the species and know which powerful serum to use.

A First Aid Kit for Snake Bite.

As a rule Scouts traveling in country inhabited by poisonous snakes have little to fear. However, a fairly complete snake-bite First Aid kit that takes little room may be assembled and is not a bad thing to carry. Small wooden or metal cases may be obtained which have a scalpel or tiny knife in one protected by a cap.

You should have some sort of a tourniquet — either a strap as used by the Red Cross or a length of good rubber bandage. This latter is probably the quickest and easiest to apply. You should also have a bottle of antiseptic and a roll of gauze bandage. These can be packed in a small box or some other convenient receptacle.

Field Work.

Collecting and other field work will probably be a source of great interest and pleasure. There is no better knowledge than that gained through careful observation. Moreover such activity is closely bound up with camps, hikes and other trips through the woods and fields. What real Scout does not fairly thrill at the mention of these things?

Catching And Handling Reptiles.

When we go out searching for the little things of nature, but often when we are not thinking of these things at all, we are likely to come across reptiles of one kind or another. For this reason it is always a good plan to carry a cloth bag in your belt or pocket if you wish to bring back your prize. A forked stick will help you to catch any snake you may come across. Often it will be more effective to grab the animal with your hands or put your foot down easily but firmly. Before you try this, however, you should be well acquainted with live specimens of any poisonous snakes that may be found where you are traveling. A pair of leather gloves is convenient though not necessary. When wearing them, you will be protected from the bites of non-

venomous ones. The bites of harmless snakes and lizards, though often starting in the suddenness with which they are delivered, are of no more particular danger than briar scratches. Of course, like any wounds, they may become infected and it is always safer to apply an antiseptic to them.

Snakes if grabbed back of the head will have little chance to bite, and lizards may also be held effectively in this manner. It is the only safe way to hold poisonous snakes. They should be grasped firmly just back of the angle of the jaws. The thumb and second finger should hold the reptile on either side of the neck while the index finger holds down the top of the head, giving added control over the animal. Snakes' heads, especially those of the venomous species, are quite flexible and can twist around in such a way that one must be careful in holding them. The body should be held in the other hand so the snake cannot twist around something and pull free. Held thus, even if it should free itself, it can quickly be dropped and will have no opportunity to hold on with its tail. It cannot be too often stressed that a Scout should not attempt to handle venomous reptiles until he has had a great deal of experience with non-poisonous forms and then only with the utmost care. We are all apt to be careless, and when human life is at stake, every precaution should be taken. In handling non-venomous species, normal care will prevent their biting. A large snake such as a Bull snake can dig one's hand quite a little and might cause some nasty scratches on the face if it struck there. Nearly every wild animal will bite when first captured and reptiles are naturally no exception. Even little Garter snakes will strike quite viciously, though they are harmless and often cannot break the skin.

Where to Look for Reptiles.

Reptiles are found in nearly every kind of country. Along the banks of streams and ponds we see Garter Snakes, Water Snakes and various turtles. In the surrounding fields we are apt to come across Grass Snakes and perhaps if it is stony, DeKay Snakes or other small species under these stones. Old stone walls near thicker brush are favorite haunts of the Black Snake. In more out of the way localities, especially in rocky hillsides or mountains we are apt to come across Ring-neck Snakes under flat stones, or a Moun-

tain Black sunning itself. Sometimes a Timber Rattler may be found or a Copperhead since they also like this kind of country. Here too, we may see a Skink flash across an open space. In low sandy country, however, we will find an entirely different fauna. Every species has a particular type of habitat and it is through searching in different places that we will learn best what to expect. Lizards, as a whole, prefer dry places so our western deserts have the greater number of species.

In searching for reptiles, stones, especially flat ones, should be carefully overturned. Abundance of food means a great deal to all animals, so this should be taken into account. Milk Snakes, for instance, are often found near houses, barns, or even abandoned shacks because of the mice found there.

To catch a snake asleep is not an easy task since they sleep with their eyes open, both figuratively and literally. By making very little noise and moving very slowly you may sometimes get close enough to make a sudden grab. Water Snakes often dive off a bank, turn and come up under the overhanging edge of shrubbery where they may sometimes be caught. If frightened too much they will dive in and stay under the water, out of sight. Real "Snake holes" are less common than most people think. There are a number of animals that dig holes, snakes probably doing the least of it. Comparatively few species of snakes live underground. There are some burrowing species that are found when plowing or digging either in fields or woods, but the majority simply seek some crevice under wood or stone in which to hide.

Salamanders Are Not Lizards.

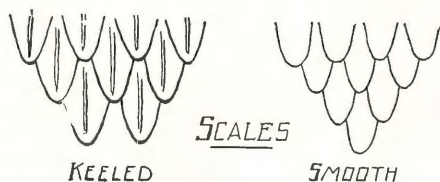
Don't mistake the salamanders that you are likely to find under rotting logs and damp stones for lizards. Remember that all lizards have scales like a snake though these may be very tiny. They also have claws on their feet. Sala-

manders usually have a smooth moist skin and never have claws.

Identifying Reptiles.

In the accurate identification of reptiles, color is often only a secondary factor. There are several reasons for this. One is that the coloration and pattern of reptiles vary even in the same species. Moreover, preserved specimens from which scientific descriptions are often taken, lose much of their color in alcohol. Individuals themselves vary greatly according to age, environment, and condition of skin. However there are certain characteristics that do not vary in a specimen and which are, therefore, used in most descriptions. In lizards and snakes one of these is the relationship and number of the scales or plates on the head, as well as scale counts in other parts of the body. For one thing the number of labials or scales on the lips differ. The Red-bellied Snake, for example, usually has six on either side while the DeKay Snake, belonging in the same genus, has seven. Then there is the number of rows of scales across the back. These may be counted easiest by following one series diagonally around the body. The common Black Snake has fifteen rows while the Mountain or Pilot Black Snake has twenty-seven or twenty-nine rows.

Another identifying character is the anal plate (covering the anal opening or vent at the base of the tail) which may or may not be divided. The number of plates on the belly, and those on the tail are also used occasionally in identification. In some species the scales are keeled, while in others



they are smooth. "Keeled" scales have little ridges down the center similar to the keel of a ship. It is these that give a Rattler such a rough appearance while their absence makes the Black Snake so smooth and shiny. All this seems hard at first, but you will find that you soon become used to these various differences, in fact, come to look for some of them instinctively. Try it! Those

who have reptiles to identify will find that after the first time or two it will go fairly easily. Moreover, most of the descriptive books give charts showing the use of the unusual or technical terms.

Age And Sex.

It is nearly impossible to accurately tell the age of reptiles, except in a few species. Some of the turtles like the Box, show concentric rings inside each scute. These represent seasons of growth and correspond to the number of years. Even these, however, wear away in old specimens and so form an imperfect record. With snakes and lizards, the only way is to know the approximate rate of growth. In a few cases the coloring changes with age. Thus a young Black Snake closely resembles a young Milk Snake but after the second year assumes the characteristic black. Sex is also told with difficulty in living specimens. As a rule the tails of snakes are shorter in the female than in the male. In the common Box Turtle, sex may easily be distinguished as the females have light brown eyes while in the males they are reddish. As a rule, unfortunately, it is much more difficult however. Reptiles seldom vary in color with sex as do the birds.

How A Snake Moves.

We can all understand how a lizard or a turtle crawls or walks because they have legs. Snakes haven't these, yet they get there "just the same." How, then, does a snake progress? People used to think snakes went in a series of loops or arches raised from the ground. It is true that a snake does gain much of its propulsion by looping the body, but these loops lie flat on the ground. The entire under surface of a snake's body is covered with large scales or scutes reaching from one side to the other and laid like shingles with their free ends towards the tail. Moreover there is a pair of ribs for each of these. Thus by moving the ends of the ribs forward the scales slide forward too, but catch when the reverse muscular movement is applied. In this way some are moved on, while others hold against slipping back, and then this action is repeated with the opposite set. Watch a caterpillar and you will get some idea of it. To aid this the snake also loops its body, and while the

scales near the head catch on the ground and prevent this part of the body moving back the rest of the body is drawn up. Then the head is thrust forward and the rear scales hold. Thus the movement of the ribs, carried on through the ventral scales is combined with the movement of the body as a whole. For this reason a snake has a hard time on any smooth surface and is almost helpless on a piece of glass, but nevertheless slides very gracefully over the ground or through the grass. Some of the large snakes, namely, the Boas and Pythons, have an interesting peculiarity in what are called "spurs" on either side of the base of the tail. These are, in reality, the protrusion of the vestiges of legs which are represented inside the body by several small bones. This is one of many proofs that snakes evolved from lizards, but found that in their mode of life they could get along without legs. These spurs do not assist in moving the body, however.

Reptiles Will Become Tame.

There are a few species of snakes that seldom attempt to bite. The apparently terrible Puff Adder is one of these. Though it goes through all the motions of striking fiercely, it seldom opens its mouth and makes no attempt to really bite. As a rule too, most snakes and lizards may be tamed with careful handling so that in a short time they will cease biting. The main thing to remember when handling a snake is to show no fear, and to move slowly and without any sudden actions. It is the sudden pass of a hand, or nervous jerk that frightens a reptile and makes it most likely to bite. Usually with calm and gentle treatment a snake will soon allow its keeper to handle it freely. There are differences in reptiles' temperaments just as there are those of other animals and some individuals will always remain nervous, quick tempered and uncertain. The best way to become familiar with their natures is to get rid of your own fears—and then make friends.

Keeping Reptiles As Pets.

Keeping reptiles in captivity should not be attempted unless you are able to give the animals more or less natural surroundings with plenty of sunlight and a steady supply of suitable food. Most reptiles do best in a dry cage with a

pan of drinking water set in. Nearly all snakes like to soak occasionally and some provision should be provided. Other conditions will depend on the habits of the beasts. Sunlight is absolutely necessary for the welfare of most species. Without sun to bask in for a few hours each day, captive specimens do not remain healthy and seldom feed readily. The food question too is one that requires serious thought. Most reptiles prefer living food, and some insist upon it. Some small snakes and most of the lizards will take meal worms which can be bought at bird stores and raised at home. The larger snakes, however, usually desire such food as mice, and these are often hard to obtain when you really want them. Reptiles will live long periods without food and this helps some but does not actually solve the problem. These animals, especially snakes, will sometimes fast willingly for months. One Copperhead that I know of lived for eleven months without food and the New York Zoological Garden had a Python that refused food for twenty-three months. They cannot, however, do without water for any great period. Forcible feeding can be, and is, resorted to but it is often hard on the reptile and sometimes ends fatally.

Turtles as a rule live better in captivity than do other reptiles. They eat more willingly and are not so particular in their diet. Meat, fish, greens such as lettuce, and even fruit are often taken. Water turtles are most likely to stick to the meat and fish, while land species prefer a variety. Most water turtles, too, require enough water so that food may be eaten under the surface as they cannot swallow out of water. In feeding any reptile you will often have to experiment quite a little before food is found that will attract it.

Fear Of Snakes.

Above all, remember and respect others' fear of snakes. People have been known to become insane through having a snake suddenly thrust upon them. To tease a frightened person with a snake is thoughtless and even dangerous. A Scout is considerate of others. Since most dread of snakes is through ignorance, Scouts can do good work by correcting this. Time and time again I have seen groups of both children and adults gathered around, (at a safe distance), a

leader who was quietly talking about snakes, telling the many interesting things in connection with them and pointing these things out on a specimen that he held in his hands. As more and more was told, and as the many ignorant beliefs were pointed out as false, first one and then another of the group would come closer till finally some would touch the snake. Others followed until even the most timid forgot their fear. Nearly all of them were willing eventually to feel the snake's ribs, to look for the keeled scales, or to feel the animal warming up from the body heat of the person holding it.

Another interesting thing is that all this "inborn dread" of snakes is usually lacking in small children. Children get their fear from their elders who tell them to leave the "nasty, slimy things alone," that "it will sting" them and "poison" them and all the other queer ideas that you have probably heard. You will also find that the younger boys in your troop usually get over their fear more quickly than the older fellows. Always remember though,—go easily when trying to convince a person that snakes are not dangerous, that they are not slimy, and that they are really quite useful creatures. To do this is sometimes a task and one well worth doing, but it should not be spoiled in the beginning, perhaps forever, by a hasty or inconsiderate act on your part.

Superstitions and Fallacies Regarding Snakes.

For some reason there has grown up around reptiles, and especially snakes, a great host of superstitions and strange, erroneous beliefs. The fear of reptiles sometimes amounts to a wild dread and it is hard to say whether this fear has lead to a number of the superstitions or vice versa. Whatever the cause, some of these ideas are most highly colored and improbable, yet people will swear to their truth. The following are some of the most widespread and deeply rooted:

1. "Snakes are slimy." Hardly a person who has not actually handled a snake does not believe this. Yet snakes are not even moist, unless just after having come out of the water. They are very clean and not disagreeable to handle. Some snakes do have a very smooth surface that glistens in the light, but to the touch this resembles celluloid. Reptiles are "cold-blooded." That is, their body temperature varies

with that of their surroundings and since they have no fur or feathers they cannot long retain warmth. However, they are not really "cold and nasty."

2. "A snake stings with its tongue, or tail." Though the tongue is constantly darted in and out of a snake's mouth, it is, as I have said before, primarily a feeler, and is too soft to even pierce through tissue paper. Neither has the tail anything to do with stinging. Some snakes have a horny tip on the tail which is often poked around, but this is to seek a purchase in order to help the snake move about. It is usually the burrowing forms that have this type of appendage. Of course, various Horn Snake and Hoop Snake stories are impossible, though they may have originated from snakes with horny tipped tails.

3. "Snakes charm other animals." This is without truth. The fact that snakes have no eyelids give them a continuous staring expression, but that has nothing to do with charming. Sometimes a bird or mammal, suddenly frightened will "freeze" or remain motionless. In other cases they will sometimes become particularly brave, especially in guarding a nest or young, and while vainly trying to drive the reptile away will come within its grasp. It is obvious that this, also, is not through being "charmed" as some people would have us believe.

4. "Green snakes are poisonous." This is not necessarily true. There is certainly no causal relation between venom and color. In the United States none of our green snakes are venomous.

5. "That a snake's tail will not die until sundown." It is true that a snake's tail will often continue to move for quite a while after the serpent has been killed, but the sun has nothing to do with this movement. It is rather due to the fact that, in an animal whose brain is as comparatively unspecialized as is that of a snake, many of the movements of the body are controlled by nerves independent of the brain and are known as "reflex actions." In such animals these cells remain alive for some time after what is generally considered death.

6. "The Hoop Snake story," though widespread, is purely

imaginative. Notwithstanding the many people who claim to have seen the snakes, no specimens have ever been seen by an authority, even after one State Agriculture Department offered \$500 reward for one of these. Further, it is structurally impossible for a snake to roll about in the form of a hoop.

7. That certain "snakes suck or milk cows," is another belief which is adhered to by many but which is disbelieved by all who really know snakes. In the first place a snake in sucking would without question sink its teeth into the cow or at least scratch it. What cow would stand for such treatment? Another point against this belief is that a snake can hold only a comparatively small amount of milk, while in the cow-milking story the cow usually comes home with a noticeably decreased supply. Snakes have been held while milk was poured down their throats yet most of it ran out again as soon as the reptiles were put down because their throat muscles were not sufficient to retain such a quantity.

8. Another queer idea is that "a harmless snake when fighting with a poisonous one will seek a certain plant as a cure for the venom." I have heard people describe such fights, declaring that at intervals one of the snakes would break away, dash up to a plant, nibble its leaves, and then return to the battle. Thrilling to listen to, but as for the fact behind it—well, reason it out. It would mean that the snakes know just what plant to eat, which calls for quite a little intelligence! Then the idea of a poisonous and non-poisonous snake "fighting." Snakes may eat each other but they do not engage in this class of wrestling bout. Once the cannibal grasps the other it does not let go if it can help it. Either the author of this story had a very vivid imagination, or the gaps in his observation were filled, through ignorance, with ideas which had been suggested to him at other times.

9. Many people believe that "snakes when cut or broken in pieces will reunite and live." Why do people insist on making serpents so unnatural? No one would even think of a dog or cat doing such a thing. Yet the "machinery" of a reptile is practically the same. As I mentioned before, reptiles will sometimes move for a time after death, due to reflex action of the muscles, but that is the full extent of their

power. Many lizards have brittle tails that break off easily and new ones will gradually grow on, but the cells of the broken part die in a few moments. Some snake-like lizards, called "Glass Snakes," have very long tails and relatively short bodies so that when their tails break off it sometimes looks as if the animal had broken in two. However, the body itself does not break, or if it does, the animal dies. As was previously stated, lizards will grow new tails but they are of course in no way connected with the old one.

10. "Snakes swallow their young for protection." We hear this statement time and again, yet those who have studied snakes feel that they cannot believe it. No snake is known to have any special arrangement inside to take care of swallowed young. Therefore, they must run down the throat into the stomach. There they run into digestive juices strong enough to dissolve bone! What would happen to them? Moreover, how do they turn around again? It is pretty close quarters in a snake's "inerts." What probably happens is that either the young by accident ran into the snake's mouth, or that snakes seen to swallow their "young" were in reality swallowing another snake for food. Since in some snakes the young are born alive, the story might be due to the discovery of unborn young in the mother's body.

11. "Snakes chase and attack people without provocation." This belief has spoiled many outings. Black Snakes are commonly believed to be poisonous and to chase people. Both of these ideas are untrue. The first instinct in most snakes, when they see a human near them, is to get away as fast as possible. They are fully as startled and frightened as is the person who comes upon them unexpectedly.

12. "Snakes, especially poisonous ones, will spring up at persons to bite them." Some believe that snakes can leap several feet when striking. Any Scout ought to know better than this, and should attempt to help others to get away from this mistaken notion.

13. "Snakes assume the form of a spring before striking." Both in pictures and in stories we see and hear of snakes coiled perfectly like a spring, and ready to strike. In reality, a Rattler or similar snake will perhaps partially curl its body once but the rest of it is thrown into several

graceful loops not unlike a letter S, and it is from this position that a snake endeavors to strike. (See drawing of rattlesnake on page 1.) Try coiling a rope and then thrusting one end out. You will notice that it either kinks on itself or must roll over and over to straighten out. I might say here, however, that a snake can bite from almost any other position, and a poisonous snake can bring the fangs into play when just biting, that is, without really striking. A snake does not have to "coil" in order to strike.

14. "Snakes have distinctive medical properties." There are many different medical properties incorrectly connected with snakes. Perhaps the most dangerous of these are the fallacies about snake bite treatment. A second bite in the same place by a venomous snake will *not* cure the first. It is just that much more deadly. Neither are the preparations made from a venomous snake of any use when applied to a bite. Snake galls, livers and various other organs are sometimes used to draw the poison, without effect. Some uncivilized tribes even apply the dry ground-up heads (including the poison glands) of poisonous snakes, regardless of the fact that snake poison, dried, is just as deadly in a wound as fresh. Probably all have heard of Rattlesnake oil being used for deafness, rheumatism and the like, while the flesh and various organs are sometimes used for other ailments. These may all be considered ineffective. It would be more to the point if people advocated the use of snakes for food, since their flesh would no doubt serve well for this. One of the Museum men, recently returned from China, said that the Chinese believed he was catching snakes to bring here for medical purposes, and they couldn't understand how we had lived so long without discovering how important snakes were in this respect.

It is wiser to disbelieve all the popular stories we hear about snakes, and to just take facts that we know are tried and true, or that we have positively observed ourselves. This will make us more careful to observe exactly what goes on about us instead of taking most of it for granted. It would certainly do away with a large amount of fear based on false beliefs. If this is the case, then let us all get busy. There are many, many points to be corrected and still more that never have been observed and should be added to our true knowledge of reptiles.

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